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APPLICABILITY OF ERTS FOR SURVEYING
ANTARCTIC ICEBERG RESOURCES

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Progress Report for May and June 1973

Prepared for

GODDARD SPACE FLIGHT CENTER
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APPLICABILITY OF ERTS FOR SURVEYING
ANTARCTIC ICEBERG RESOURCES

(MMC#059, NAS5-21095)

Second Progress Report, May and June 1973

John L. Hult (PR 101)

We apparently have received most of the remaining standing order imagery that was obtained before recorder difficulties interrupted imaging activities over the Antarctic. There was a greatly reduced image sampling rate in our test sector in February and March. Our April data requests for imagery of drift ice areas in the Antarctic outside of our test area were not approved, and the retrospective bulk positive transparencies that were requested at the same time for magnification and analysis of iceberg characteristics have not yet been received. The degree to which cloud cover prevails in the Antarctic severely limits the useful imagery and requires extensive repetitive coverage to obtain the imagery required for most of our analyses. The original objectives of our studies may not be as completely achievable as hoped for because of the limited useful imagery and the delays in obtaining it; however, we still expect to say something about the economic value of this future operational application of ERTS on contract schedule.

Accomplishments

We have received all of our standing order imagery as far as we know, and it has been catalogued and organized for efficient handling and analysis. Much of the cloud cover, sea ice cover, and topography analysis has been accomplished. We have completed and submitted the image descriptor forms for the remaining images received during the reporting period. The proposed organization and content of our final report has been developed and an outline is herewith submitted for comment and approval. Since most of the work has been supported by NSF grant, but the imagery was obtained under NASA contract we plan to submit it to both sponsors. It will not be released to the public until we receive NASA approval according to contract. A draft of the final report is due by 15 August and we contemplate no further reporting requirement.

Final Report Outline

Title: ERTS FOR ANTARCTIC ICEBERG RESOURCES

Front Matter

Text

Introduction

Results from ERTS-I

Cloud Cover

- Discussion of cloud cover definitions, relevance to this project, and objectives of the analysis. Illustrations of pertinent images.
- Map showing partition into 9 sectors by orbital parallels and showing center locations of all standing order images.
- Figure showing cloud cover comparisons over drift ice, catalog vs. our interpretation and definition, partitioned by orbital sector combinations and by period and showing number of images represented in each category.
- Figure as above with various combinations of periods.
- Figure showing cloud cover comparisons over fixed ice vs. over drift ice, for various orbital sector and time period combinations from all catalog Antarctic data.
- Interpretation of the role of cloud cover in the potential performance of various means of obtaining the desired image information.

Sea Ice Contours and Movements

- Discussion of behavior of sea ice from previously recorded data.
- Image illustrations showing various types of sea ice.
- Figure showing seasonal sea ice contour behavior as obtained from ERTS imagery.
- Interpretation of the role of sea ice in the harvesting of Antarctic icebergs.

Sampled Iceberg Characteristics

- Discussion of relevant characteristics; lengths, widths, areas. Density of icebergs and aggregated mass. Probable life and movement behavior.
- Image illustrations showing characteristic differences vs. area sampled.

- Figure presenting statistics of sampled iceberg characteristics.
- Interpreting the influence and suitability of various iceberg characteristics in harvesting and transporting the icebergs to using terminals.

Antarctic Topography

- Discussion of types of updating topographic information that can be obtained from ERTS Imagery.
- Table listing images with the nature of the useful updating information.

ERTS System Potential

Antarctic Icebergs as a Global Fresh Water Resource and the Potential Role of ERTS

Discussion and reference to Report for NSF on subject.

Obtaining Live Imagery

Possible system configurations, performances and costs.

Thermal Imagery and the Potentials at Other Wavelengths

Cloud cover, resolution, seasonal influences, identification and iceberg height measurements by temperature differences.

Seasonal Sea Ice Behavior and Iceberg Evolution.

Control and Access Information.

Claiming and Monitoring Service.

Proposal for Establishing Entitlements to Antarctic Iceberg Resources.

Economic Potentials

- Estimated costs of desired ERTS information.
- Estimated revenue that might be derived from iceberg harvesting systems.
- Estimates of increased costs of harvesting icebergs without ERTS information or by other means.

ERTS Image Descriptor Forms

Only one image descriptor form listing 26 images that had useful information other than cloud coverage was submitted during the period. A copy is attached.

ERTS IMAGE DESCRIPTOR FORM

(See Instructions on Back)

DATE 20 June 1973PRINCIPAL INVESTIGATOR John L. HultGSFC PR 101ORGANIZATION The Rand Corporation

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N _____
ID _____

PRODUCT ID (INCLUDE BAND AND PRODUCT)	FREQUENTLY USED DESCRIPTORS*			DESCRIPTORS Cloud Cover %
	Ice, Sea Antarctic	Icebergs Antarctic	Antarctic topography	
1217-15114-7	✓	✓		8000
20-7	✓			9000
23-7	✓			9000
25-7	✓			9000
32-7	✓	✓	✓	9000
34-7			✓	9000
41-7			✓	9000
1217-15143-7			✓	8000
1220-20400-7			✓	20
402-7			✓	20
1220-20405-7			✓	20
1206-21013-7	✓	✓	✓	90
15-7			✓	50
22-7			✓	40
1206-21024-7			✓	20
1206-15514-7	✓	✓		9000
23-7	✓	✓		9000
25-7	✓	✓		9000
32-7	✓	✓	✓	9000
34-7	✓	✓	✓	9000
41-7			✓	9000
1206-15543-7			✓	9000
1221-12101-7			✓	20
1245-14253-7	✓	✓		80
1245-14255-7				80

*FOR DESCRIPTORS WHICH WILL OCCUR FREQUENTLY, WRITE THE DESCRIPTOR TERMS IN THESE COLUMN HEADING SPACES NOW AND USE A CHECK (✓) MARK IN THE APPROPRIATE PRODUCT ID LINES. (FOR OTHER DESCRIPTORS, WRITE THE TERM UNDER THE DESCRIPTORS COLUMN).

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